

TENT COOPERATION TRE Y

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room 524
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE
 ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 27 October 2000 (27.10.00)	
International application No. PCT/GB00/00704	Applicant's or agent's file reference DCW/VSW
International filing date (day/month/year) 28 February 2000 (28.02.00)	Priority date (day/month/year) 05 March 1999 (05.03.99)
Applicant BAIN, Duncan, Shirreffs et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

30 September 2000 (30.09.00)

☐ in a notice effecting later election filed with the International Bureau on:2. The election ☒ was☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Juan Cruz Telephone No.: (41-22) 338.83.38
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PATENT COOPERATION TREATY

PCT

From the INTERNATIONAL BUREAU

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

To:

WOODCRAFT, David, Charles
Brookes Batchellor
102-108 Clerkenwell Road
London EC1M 5SA
ROYAUME-UNI

Date of mailing (day/month/year)

05 July 2001 (05.07.01)

Applicant's or agent's file reference

DCW/SH/B2309

IMPORTANT NOTIFICATION

International application No.

PCT/GB00/00704

International filing date (day/month/year)

28 February 2000 (28.02.00)

1. The following indications appeared on record concerning:

☐ the applicant ☐ the inventor ☒ the agent ☐ the common representative

Name and Address

WOODCRAFT, David, Charles
Brookes & Martin
High Holborn House
52/54 High Holborn
London WC1V 6SE
United Kingdom

State of Nationality

State of Residence

Telephone No.

020 7242 9631

Facsimile No.

020 7531 0856

Teleprinter No.

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐ the person ☐ the name ☒ the address ☐ the nationality ☐ the residence

Name and Address

WOODCRAFT, David, Charles
Brookes Batchellor
102-108 Clerkenwell Road
London EC1M 5SA
United Kingdom

State of Nationality

State of Residence

Telephone No.

020 7253 1563

Facsimile No.

020 7253 1214

Teleprinter No.

3. Further observations, if necessary:

4. A copy of this notification has been sent to:

☒ the receiving Office ☐ the designated Offices concerned
☐ the International Searching Authority ☒ the elected Offices concerned
☐ the International Preliminary Examining Authority ☐ other:The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

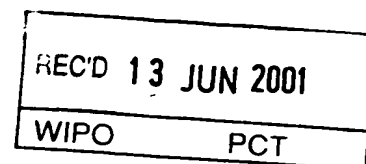
Facsimile No.: (41-22) 740.14.35

Authorized officer

Anman QIU

Telephone No.: (41-22) 338.83.38

PATENT COOPERATION TREATY PCT



INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Article 36 and Rule 70)

Applicant's or agent's file reference DCW/VSW	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB00/00704	International filing date (day/month/year) 28/02/2000	Priority date (day/month/year) 05/03/1999
International Patent Classification (IPC) or national classification and IPC A47C31/12		
Applicant BAIN, Duncan, Shirreffs et al.		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 7 sheets.</p>		
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input checked="" type="checkbox"/> Certain defects in the international application VIII <input checked="" type="checkbox"/> Certain observations on the international application 		
Date of submission of the demand 30/09/2000	Date of completion of this report 11.06.2001	
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Vesin, S Telephone No. +49 89 2399 7489	



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/00704

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1,3-5,7	as published			
2,2a,6	as received on	31/03/2001	with letter of	28/02/2001

Claims, No.:

1-10	as received on	31/03/2001	with letter of	28/02/2001
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Drawings, sheets:

2/4,4/4	as published			
1/4,3/4	as received on	31/03/2001	with letter of	28/02/2001

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB00/00704

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-10
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-10
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-10
	No:	Claims	

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

R Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. State of the art

Reference is made to the following document:

D1: US-A-4 140 008

D2: DE 41 39 697 A

2. Independent claim 1

2.1 The subject-matter of claim 1 is novel and involves an inventive step.

2.2 The document D1, which is regarded as being the closest prior art to the subject-matter of independent claim 1 discloses

an apparatus for assessing the condition of a person support surface 10 (cf. col. 1, lines 1-2) which comprises a frame 14 for extending over the support surface 10, an indenter 22,28 mounted on said frame 14 and a load sensor 30 disposed between the indenter and the frame (cf. col. 2, lines 29-35), means 50 for pressing the indenter into the support surface (cf. fig. 1 and col. 2, lines 44-47), displacement measuring means 54,56 for measuring the movement of the indenter into the support surface (cf. col. 2, lines 57-62) and data processing means 34,36 for analysing the force applied to the indenter 22,28 in relation to the displacement of the indenter 22,28 into support surface 10 (cf. figs. 3-5 and col. 3, lines 17-27).

2.3 The apparatus of claim 1 therefore differs from this known apparatus of D1 in that it is mobile and the means for pressing the indenter into the support surface are manually actuated.

2.4 The problem to be solved by the present invention may therefore be regarded as as to provide an assessing apparatus, which is not only simple to operate but also readily transportable between operating locations.

- 2.5 The apparatus for assessing mattresses disclosed in document D2 is also readily transportable between operating locations (cf. last sentence of Abstract). However, neither D2 nor the assessing apparatus forming part of the prior art give any indications on how to adapt the apparatus of D1 so as to solve the technical problem of making it simple to operate and thus it is not obvious for the skilled person to provide the apparatus of D1 with manually actuated means so as to arrive at the invention claimed in claim 1.

3. Independent claim 10

- 3.1 The method of claim 10 is novel and involves an inventive step.

The document D1 which is regarded as being the closest prior art to the subject-matter of independent claim 10 discloses

a method of testing a mattress which comprises applying to the surface of the mattress 10 an indenter 22,28, depressing the indenter 22,28 into the mattress 10 (cf. col. 1, lines 25-27), measuring the displacement of the indenter as a function of the load applied to the indenter 22,28 (cf. col. 3, lines 17-21), constructing a load/displacement curve (cf. fig. 3-5).

- 3.2 The method of claim 10 therefore differs from this known method of D1 in that the mattress is tested in situ on a bed base and in that the method further comprises the step of discriminating the displacement arising from deflection of the bed base to thereby identify the load/displacement relationship of the mattress.
- 3.3 The problem to be solved by the present invention may therefore be regarded as to elaborate a method of testing mattresses, which can be done in situ and filtering out only the displacement of the mattress of D1.
- 3.4 The method of testing mattresses forming part of the prior art do not give any indications on how to adapt the apparatus of D1 so as to solve the technical problem and thus it is not obvious for the skilled person to use this method in situ by filtering the displacement of the base of D1 so as to arrive at the invention claimed in claim 10.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB00/00704

Re Item VII

Certain defects in the international application

1. To be consistent with claim 1, the feature "manually operated means" on line 2 of claim 5 should read "manually **actuated** means" (Rule 6.4(b) PCT).
2. A type mismatch occurred on the first word of page 2. The word "is" should read "its".

Re Item VIII

Certain observations on the international application

- 1 Firstly, due to the introduction of the adjective "mobile" in independent claim 1, only the embodiment of the invention described on page 6, second paragraph and shown in figure 4 does fall within the scope of claim 1. This inconsistency between the claim and the description, leads to doubt concerning the matter for which protection is sought (Article 6 PCT).
Secondly, such an adjective is only a relative attribute of a function, which tends to define the claim by a purpose to be achieved, thereby rendering the claim unclear (Article 6 PCT).
2. It is considered that by defining the claim in terms of structural features to express that the apparatus is relocatable in order to operate, so that the indenter acts on a support surface retained in situ, both clarity problems would be solved.

The demand must be filed directly with the competent International Preliminary Examining Authority. If two or more Authorities are competent, with the one chosen by the applicant. The full name or two-letter code of that Authority may be indicated by the applicant on the line below:

IPEA/ _____

PCT

CHAPTER II

DEMAND

under Article 31 of the Patent Cooperation Treaty:
The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty and hereby elects all eligible States (except where otherwise indicated).

For International Preliminary Examining Authority use only	
Identification of IPEA	Date of receipt of DEMAND
Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION	
Applicant's or agent's file reference DCW/VSU	
International application No. PCT/GB00/00704	International filing date (day/month/year) 28 FEBRUARY 2000
(Earliest) Priority date (day/month/year) 5 MARCH 1999	
Title of invention APPARATUS FOR ASSESSMENT OF MATTRESSES	
Box No. II APPLICANT(S)	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)	
BAIN, Duncan Shirreffs 531a North Deeside Road Cults Aberdeen Scotland	
Telephone No.:	
Facsimile No.:	
Teleprinter No.:	
State (that is, country) of nationality: GB	State (that is, country) of residence: GB
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)	
FERGUSON-PELL, Martin 9 The Leys Chesham Bois Buckinghamshire	
State (that is, country) of nationality: GB	State (that is, country) of residence: GB
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)	
DAVIES, Patrick John 1 Colthorpe Street Bondall Queensland Australia 4034	
State (that is, country) of nationality: AUSTRALIA	State (that is, country) of residence: AUSTRALIA
<input type="checkbox"/> Further applicants are indicated on a continuation sheet.	

Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCEThe following person is ☒ agent ☐ common representativeand ☒ has been appointed earlier and represents the applicant(s) also for international preliminary examination.☐ is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked.☐ is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.Name and address: *(Family name followed by given name; for a legal entity, full official designation.
The address must include postal code and name of country.)*WOODCRAFT, David Charles
BROOKES & MARTIN
High Holborn House
52/54 High Holborn
London WC1V 6SE
GB

Telephone No.:

020 7242 9631

Facsimile No.:

020 7831 0586

Teleprinter No.:

☐ **Address for correspondence:** Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.**Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION****Statement concerning amendments: ***

1. The applicant wishes the international preliminary examination to start on the basis of:

☒ the international application as originally filedthe description ☐ as originally filed☐ as amended under Article 34the claims ☐ as originally filed☐ as amended under Article 19 (together with any accompanying statement)☐ as amended under Article 34the drawings ☐ as originally filed☐ as amended under Article 342. ☐ The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.3. ☐ The applicant wishes the start of the international preliminary examination to be postponed until the expiration of 20 months from the priority date unless the International Preliminary Examining Authority receives a copy of any amendments made under Article 19 or a notice from the applicant that he does not wish to make such amendments (Rule 69.1(d)). *(This check-box may be marked only where the time limit under Article 19 has not yet expired.)*

* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: ENGLISH☒ which is the language in which the international application was filed.☐ which is the language of a translation furnished for the purposes of international search.☐ which is the language of publication of the international application.☐ which is the language of the translation (to be) furnished for the purposes of international preliminary examination.**Box No. V ELECTION OF STATES**The applicant hereby elects all eligible States *(that is, all States which have been designated and which are bound by Chapter II of the PCT)*

excluding the following States which the applicant wishes not to elect:

Box No. VI CHECK LIST

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:

- | | | |
|--|---|--------|
| 1. translation of international application | : | sheets |
| 2. amendments under Article 34 | : | sheets |
| 3. copy (or, where required, translation) of amendments under Article 19 | : | sheets |
| 4. copy (or, where required, translation) of statement under Article 19 | : | sheets |
| 5. letter | : | sheets |
| 6. other (<i>specify</i>) | : | sheets |

For International Preliminary Examining Authority use only

received not received

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

The demand is also accompanied by the item(s) marked below:

- | | |
|--|---|
| 1. <input checked="" type="checkbox"/> fee calculation sheet | 4. <input type="checkbox"/> statement explaining lack of signature |
| 2. <input type="checkbox"/> separate signed power of attorney | 5. <input type="checkbox"/> nucleotide and or amino acid sequence listing in computer readable form |
| 3. <input type="checkbox"/> copy of general power of attorney, reference number, if any: | 6. <input type="checkbox"/> other (<i>specify</i>): |

Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).

DAVID C. WOODCRAFT

For International Preliminary Examining Authority use only

1. Date of actual receipt of DEMAND:

2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b):

3. ☐ The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply. ☐ The applicant has been informed accordingly.

4. ☐ The date of receipt of the demand is WITHIN the period of 19 months from the priority date as extended by virtue of Rule 80.5.

5. ☐ Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82.

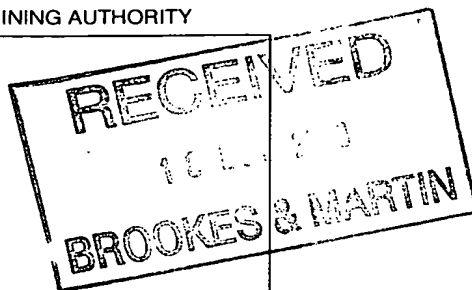
For International Bureau use only

Demand received from IPEA on:

From the:
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

V Jcraft, David, C.
BROOKES & MARTIN
High Holborn House
52/54 High Holborn
London WC1V 6SE
GRANDE BRETAGNE



PCT

WRITTEN OPINION

(PCT Rule 66)

Date of mailing
(day/month/year) 14.12.2000

Applicant's or agent's file reference
DCW/VSW

REPLY DUE within 3 month(s)
from the above date of mailing

International application No.
PCT/GB00/00704

International filing date (day/month/year)
28/02/2000

Priority date (day/month/year)
05/03/1999

International Patent Classification (IPC) or both national classification and IPC
A47C31/12

Applicant
BAIN, Duncan, Shirreffs et al.

1. This written opinion is the **first** drawn up by this International Preliminary Examining Authority.

2. This opinion contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain document cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

3. The applicant is hereby **invited to reply** to this opinion.


When? See the time limit indicated above. The applicant may, before the expiration of that time limit, request this Authority to grant an extension, see Rule 66.2(d).

How? By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

Also: For an additional opportunity to submit amendments, see Rule 66.4.
For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4 bis.
For an informal communication with the examiner, see Rule 66.6.

If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.

4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: 05/07/2001.

Name and mailing address of the international preliminary examining authority:
 European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized officer / Examiner

Vesin, S

Formalities officer (incl. extension of time limits)
Heimann, C
Telephone No. +49 89 2399 2391



I. Basis of the opinion

1. This opinion has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed".*):

Description, pages:

1-7 as published

Claims, No.:

1-10 as published

Drawings, sheets:

1/4-4/4 as published

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

WRITTEN OPINION

International application No. PCT/GB00/00704

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N) Claims 1

Inventive step (IS) Claims

Industrial applicability (IA) Claims

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. State of the art

Reference is made to the following document:

D1: US-A-4 140 008

2. Independent claim 1

2.1 The subject-matter of claim 1 cannot be considered as novel (Article 33(2) PCT) for the following reasons.

2.2 The document D1 is regarded as being the closest prior art to the subject-matter of independent claim 1, and discloses

an apparatus for assessing the condition of a person support surface 10 (cf. col. 1, lines 1-2) which comprises a frame 14 for extending over the support surface 10, an indenter 22,28 mounted on said frame 14 and a load sensor 30 disposed between the indenter and the frame (cf. col. 2, lines 29-35), manually operated means 50 for pressing the indenter into the support surface (cf. fig. 1 and col. 2, lines 44-47), displacement measuring means 54,56 for measuring the movement of the indenter into the support surface (cf. col. 2, lines 57-62) and data processing means 34,36 for analysing the force applied to the indenter 22,28 in relation to the displacement of the indenter 22,28 into support surface 10 (cf. figs. 3-5 and col. 3, lines 17-27).

3. Objection under Article 6 PCT

The novelty objection can be overcome by replacing "manually operated means" by "manually actuated means". However, this feature on its own does not suffice to fulfil the basic objective of the apparatus, which relative to the prior art is considered as seeking to provide an assessing apparatus, which is not only

simple to operate but also readily transportable between operating locations, as presented consistently throughout the description. To this end, an essential feature of the apparatus is to be mobile.

Once these amendments have been incorporated into claim 1, no further objection arise under Article 33 PCT.

4. Independent claim 10

4.1 The method of claim 10 is novel and involves an inventive step.

The document D1 which is regarded as being the closest prior art to the subject-matter of independent claim 1 discloses

a method of testing a mattress which comprises applying to the surface of the mattress 10 an indenter 22,28, depressing the indenter 22,28 into the mattress 10 (cf. col. 1, lines 25-27), measuring the displacement of the indenter as a function of the load applied to the indenter 22,28 (cf. col. 3, lines 17-21), constructing a load/displacement curve (cf. fig. 3-5).

4.2 The method of claim 10 therefore differs from this known method of D1 in that the mattress is tested in situ on a bed base and in that the method further comprises the step of discriminating the displacement arising from deflection of the bed base to thereby identify the load/displacement relationship of the mattress.

4.3 The problem to be solved by the present invention may therefore be regarded as to elaborate a method of testing mattresses, which can be done in situ and filtering out only the displacement of the mattress of D1.

4.4 The method of testing mattresses forming part of the prior art do not give any indications on how to adapt the apparatus of D1 so as to solve the technical problem and thus it is not obvious for the skilled person to use this method in situ by filtering the displacement of the base of D1 so as to arrive at the invention claimed in claim 10.

Re Item VII

Certain defects in the international application

1. Claims

- 1.1 Independent claim 1 is not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art (document D1) being placed in the preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).

In the present case, the following features are known in combination from the document D1 and belong in the preamble of such a claim:

apparatus for assessing the condition of a person support surface which comprises a frame for extending over the support surface, an indenter mounted on said frame and a load sensor disposed between the indenter and the frame, operated means for pressing the indenter into the support surface, displacement measuring means for measuring the movement of the indenter into the support surface and data processing means for analysing the force applied to the indenter in relation to the displacement of the indenter into support surface.

Independent claim 1 should therefore be redrafted accordingly. If, however, the applicant is of the opinion that the two-part form would be inappropriate, then reasons therefor should be provided in the letter of reply. In addition, the applicant should ensure that it is clear from the description which features of the subject-matter of claim 1 are already known in combination from the document D1 (see the PCT Guidelines, III-2.3a).

- 1.2 The features of the claims 1-10 are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

2. Description

- 2.1 Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art

disclosed in the document D1 is not mentioned in the description, nor is this document identified therein.

- 2.2 According to the requirements of Rule 11.13(I) reference signs not appearing in the description shall not appear in the drawings, and vice versa. This requirement is not met in view of the reference signs 10 (fig. 2) and 44 (fig. 4).
- 2.3 A type mismatch occurred on page 6, line 17. The word "fine" should be replaced by "line".

PATENT COOPERATION TREATY

Dcw

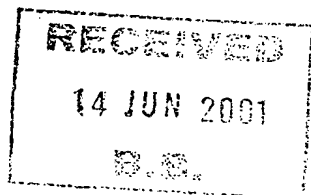
11/322

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

To:

Woodcraft, David, C.
BROOKES & MARTIN
High Holborn House
52/54 High Holborn
London WC1V 6SE
GRANDE BRETAGNE



NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL PRELIMINARY
EXAMINATION REPORT
(PCT Rule 71.1)

Date of mailing (day/month/year)	11.06.2001
-------------------------------------	------------

Applicant's or agent's file reference DCW/VSU	IMPORTANT NOTIFICATION
--	-------------------------------

International application No. PCT/GB00/00704	International filing date (day/month/year) 28/02/2000	Priority date (day/month/year) 05/03/1999
---	--	--

Applicant BAIN, Duncan, Shirreffs et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/	Authorized officer
---------------------------------------	--------------------



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Heimann, C

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PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference
(if desired) (12 characters maximum)

DCW/VSW

Box No. I TITLE OF INVENTION

APPARATUS FOR ASSESSMENT OF MATTRESSES

Box No. II APPLICANT

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

BAIN, Duncan Shirreffs
531a North Deeside Road
Cults
Aberdeen
Scotland . GB

☒ This person is also inventor.

Telephone No.

Facsimile No.

Teleprinter No.

State (that is, country) of nationality:
GBState (that is, country) of residence:
GBThis person is applicant
for the purposes of:☒ all designated
States☐ all designated States except
the United States of America☐ the United States
of America only☐ the States indicated in
the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

FERGUSON-PELL, Martin
9 The Leys
Chesham Bois
Buckinghamshire
GB

This person is:

☐ applicant only☒ applicant and inventor☐ inventor only (If this check-box
is marked, do not fill in below.)State (that is, country) of nationality:
GBState (that is, country) of residence:
GBThis person is applicant
for the purposes of:☒ all designated
States☐ all designated States except
the United States of America☐ the United States
of America only☐ the States indicated in
the Supplemental Box☐ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:

☒ agent☐ common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

WOODCRAFT, David Charles
Brookes & Martin
High Holborn House
52/54 High Holborn
London WC1V 6SE
GB

Telephone No.

020 7242 9631

Facsimile No.

020 7531 0856

Teleprinter No.

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Continuation of Box No. III FURTHER APPLICANTS AND/OR (FURTHER) INVENTORS

If none of the following sub-boxes is used, this sheet should not be included in the request.

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

DAVIES, Patrick John
1 Colthorpe Street
Bondall
Queensland
AUSTRALIA 4034

This person is:

- ☐ applicant only
☒ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:
AUSTRALIA

State (that is, country) of residence:
AUSTRALIA

This person is applicant for the purposes of:

- ☒ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

- ☐ applicant only
☐ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of:

- ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

- ☐ applicant only
☐ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of:

- ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

- ☐ applicant only
☐ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of:

- ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on another continuation sheet.

Box No.V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) (mark the applicable check-boxes; *one must be marked*):

Regional Patent

- ☒ **AP** **ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SL Sierra Leone, SZ Swaziland, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☒ **EA** **Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ **EP** **European Patent:** AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ **OA** **OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

National Patent (if other kind of protection or treatment desired, specify on dotted line).

- | | |
|---|--|
| <input checked="" type="checkbox"/> AE United Arab Emirates | <input checked="" type="checkbox"/> LR Liberia |
| <input checked="" type="checkbox"/> AL Albania | <input checked="" type="checkbox"/> LS Lesotho |
| <input checked="" type="checkbox"/> AM Armenia | <input checked="" type="checkbox"/> LT Lithuania |
| <input checked="" type="checkbox"/> AT Austria | <input checked="" type="checkbox"/> LU Luxembourg |
| <input checked="" type="checkbox"/> AU Australia | <input checked="" type="checkbox"/> LV Latvia |
| <input checked="" type="checkbox"/> AZ Azerbaijan | <input checked="" type="checkbox"/> MD Republic of Moldova |
| <input checked="" type="checkbox"/> BA Bosnia and Herzegovina | <input checked="" type="checkbox"/> MG Madagascar |
| <input checked="" type="checkbox"/> BB Barbados | <input checked="" type="checkbox"/> MK The former Yugoslav Republic of Macedonia |
| <input checked="" type="checkbox"/> BG Bulgaria | |
| <input checked="" type="checkbox"/> BR Brazil | <input checked="" type="checkbox"/> MN Mongolia |
| <input checked="" type="checkbox"/> BY Belarus | <input checked="" type="checkbox"/> MW Malawi |
| <input checked="" type="checkbox"/> CA Canada | <input checked="" type="checkbox"/> MX Mexico |
| <input checked="" type="checkbox"/> CH and LI Switzerland and Liechtenstein | <input checked="" type="checkbox"/> NO Norway |
| <input checked="" type="checkbox"/> CN China | <input checked="" type="checkbox"/> NZ New Zealand |
| <input checked="" type="checkbox"/> CU Cuba | <input checked="" type="checkbox"/> PL Poland |
| <input checked="" type="checkbox"/> CZ Czech Republic | <input checked="" type="checkbox"/> PT Portugal |
| <input checked="" type="checkbox"/> DE Germany | <input checked="" type="checkbox"/> RO Romania |
| <input checked="" type="checkbox"/> DK Denmark | <input checked="" type="checkbox"/> RU Russian Federation |
| <input checked="" type="checkbox"/> EE Estonia | <input checked="" type="checkbox"/> SD Sudan |
| <input checked="" type="checkbox"/> ES Spain | <input checked="" type="checkbox"/> SE Sweden |
| <input checked="" type="checkbox"/> FI Finland | <input checked="" type="checkbox"/> SG Singapore |
| <input checked="" type="checkbox"/> GB United Kingdom | <input checked="" type="checkbox"/> SI Slovenia |
| <input checked="" type="checkbox"/> GD Grenada | <input checked="" type="checkbox"/> SK Slovakia |
| <input checked="" type="checkbox"/> GE Georgia | <input checked="" type="checkbox"/> SL Sierra Leone |
| <input checked="" type="checkbox"/> GH Ghana | <input checked="" type="checkbox"/> TJ Tajikistan |
| <input checked="" type="checkbox"/> GM Gambia | <input checked="" type="checkbox"/> TM Turkmenistan |
| <input checked="" type="checkbox"/> HR Croatia | <input checked="" type="checkbox"/> TR Turkey |
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| <input checked="" type="checkbox"/> ID Indonesia | <input checked="" type="checkbox"/> UA Ukraine |
| <input checked="" type="checkbox"/> IL Israel | <input checked="" type="checkbox"/> UG Uganda |
| <input checked="" type="checkbox"/> IN India | <input checked="" type="checkbox"/> US United States of America |
| <input checked="" type="checkbox"/> IS Iceland | |
| <input checked="" type="checkbox"/> JP Japan | <input checked="" type="checkbox"/> UZ Uzbekistan |
| <input checked="" type="checkbox"/> KE Kenya | <input checked="" type="checkbox"/> VN Viet Nam |
| <input checked="" type="checkbox"/> KG Kyrgyzstan | <input checked="" type="checkbox"/> YU Yugoslavia |
| <input checked="" type="checkbox"/> KP Democratic People's Republic of Korea | <input checked="" type="checkbox"/> ZA South Africa |
| | <input checked="" type="checkbox"/> ZW Zimbabwe |
| <input checked="" type="checkbox"/> KR Republic of Korea | Check-boxes reserved for designating States which have become party to the PCT after issuance of this sheet: |
| <input checked="" type="checkbox"/> KZ Kazakhstan | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> LC Saint Lucia | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> LK Sri Lanka | |

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.)

Box N . VI PRIORITY CLAIM☐ Further priority claims are indicated in the Supplemental Box.

Filing date of earlier application (day/month/year)	No. of earlier application	Where earlier application is:		
		national application: country	regional application:* regional Office	international application: receiving Office
item (1) 05/03/99	9905005.6	UK		
item (2)				
item (3)				

☐ The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office) identified above as item(s):

* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.

Box N . VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA)
(if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):

ISA /

Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):

Date (day/month/year)

Number

Country (or regional Office)

Box N . VIII CHECK LIST; LANGUAGE OF FILING

This international application contains the following number of sheets:

request : 4

description (excluding sequence listing part) : 7

claims : 2

abstract : 1

drawings : 5

sequence listing part of description : _____

Total number of sheets : 19

This international application is accompanied by the item(s) marked below:

1. ☐ fee calculation sheet2. ☐ separate signed power of attorney3. ☐ copy of general power of attorney; reference number, if any:4. ☐ statement explaining lack of signature5. ☐ priority document(s) identified in Box No. VI as item(s):6. ☐ translation of international application into (language):7. ☐ separate indications concerning deposited microorganism or other biological material8. ☐ nucleotide and/or amino acid sequence listing in computer readable form9. ☐ other (specify):

Figure of the drawings which should accompany the abstract:

Language of filing of the international application:

Box N . IX SIGNATURE OF APPLICANT OR AGENT

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).

DAVID CHARLES WOODCRAFT

For receiving Office use only

1. Date of actual receipt of the purported international application:	2. Drawings: <input type="checkbox"/> received: <input type="checkbox"/> not received:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:	
4. Date of timely receipt of the required corrections under PCT Article 11(2):	
5. International Searching Authority (if two or more are competent): ISA /	6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid.

For International Bureau use only

Date of receipt of the record copy by the International Bureau:

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ART 34 Amdt

its length and subjectively forms an opinion as to the condition of the mattress. However, this subjective test has been shown to suffer from poor repeatability and inter operator reliability.

The present invention, therefore, is directed to the provision of apparatus and method for objectively determining the condition of mattresses and other support surfaces, such as seats and wheelchair cushions.

According to one aspect of the present invention there is provided apparatus for assessing the condition of a person support surface which comprises a frame for extending over the support surface, an indenter mounted on said frame and a load sensor disposed between the indenter and the frame, manually operated means for pressing the indenter into the support surface, displacement measuring means for measuring the movement of the indenter into the support surface and data processing means for analysing the force applied to the indenter in relation to the displacement of the indenter into the support surface.

In general, the apparatus according to the invention will be portable and has a frame which is supported either from the bed base below the mattress, or from a base member which is adapted to extend beneath the bed base.

In a preferred form of the invention, the frame is supported in cantilever from one side of the support surface and the indenter is moved downwardly to depress the support surface by pressure applied to a handle by an operator. The frame may include guide means to guide movement of the indenter in an essentially vertical manner into contact with the support surface.

Figure 4 is a side elevation of a modification of the apparatus shown in Figures 1, 2 and 3. The upper part of the apparatus is constructed in the same way as in Figures 1, 2 and 4 and the same reference numerals are used to identify equivalent components.

In Figure 4, the vertical support post (20) is mounted on a platform (42) which may be supported on castors (43). The vertical profile of the platform and castors is low so that it can readily be pushed beneath a bed base (41), which may be of the divan type. In use, the apparatus is pushed beneath the bed base (41) until the post (20) touches the vertical side of the bed base. Handle (6) is depressed to bring the wheel into contact with the surface of the mattress (12) and is pushed into the mattress until maximum resistance is felt and the console (7) indicates that a proper reading has been taken. Data is then processed in the same way as described herein.

It is important to be able to test the mattresses when they are lying on an existing bed frame so that measurements can be taken in situ. In order to grade mattresses independently of the supporting frame, it is necessary to exclude the displacement of the base when the test is carried out. This is done by assuming that the load displacement curve of the mattress base is a straight line. This part of the data measured can be excluded by carrying out a double differential of the load displacement curve. This results in a figure which indicates the position of the elbow of the curve which is a function of the behaviour of the mattress. A typical load/displacement curve is given in Figure 5 from which the elbow (51) can clearly be seen.

CLAIMS:-

1 Apparatus for assessing the condition of a person support surface which comprises a frame for extending over the support surface, an indenter mounted on said frame and a load sensor disposed between the indenter and the frame, manually operated means for pressing the indenter into the support surface, displacement measuring means for measuring the movement of the indenter into the support surface and data processing means for analysing the force applied to the indenter in relation to the displacement of the indenter into the support surface.

2. Apparatus according to claim 1 wherein the frame is supported in cantilever from one side of the support surface.

3. Apparatus according to claim 1 or 2 wherein the frame includes means for removable attachment to a bed base for supporting a mattress.

4. Apparatus according to claim 2 wherein the frame is supported from a base member adapted to extend beneath a bed base, while said frame is adapted to extend in cantilever over a mattress supported on said bed base.

5. Apparatus according to any one of the preceding claims wherein said manually operated means comprises a handle for depressing the indenter into the support surface.

6. Apparatus according to any one of the preceding claims wherein the indenter comprises a curved surface mounted for rotational movement on said frame.

7. Apparatus according to claim 6 wherein the curved surface comprises a wheel or sphere.

8. Apparatus according to any one of the preceding claims wherein the frame comprises a parallelogram linkage.

9. Apparatus according to any one of the preceding claims wherein said processing means includes means for assigning an identifying code to the support surface to be tested and for preparing a label bearing said code and data relating to the behaviour of the mattress when tested.

10. A method of testing a mattress in situ on a bed base which comprises applying to the surface of the mattress an indenter, depressing the indenter into the mattress, measuring the displacement of the indenter as a function of the load applied to the indenter, constructing a load/displacement curve and discriminating the displacement arising from deflection of the bed base to thereby identify the load/displacement relationship of the mattress.

1/4

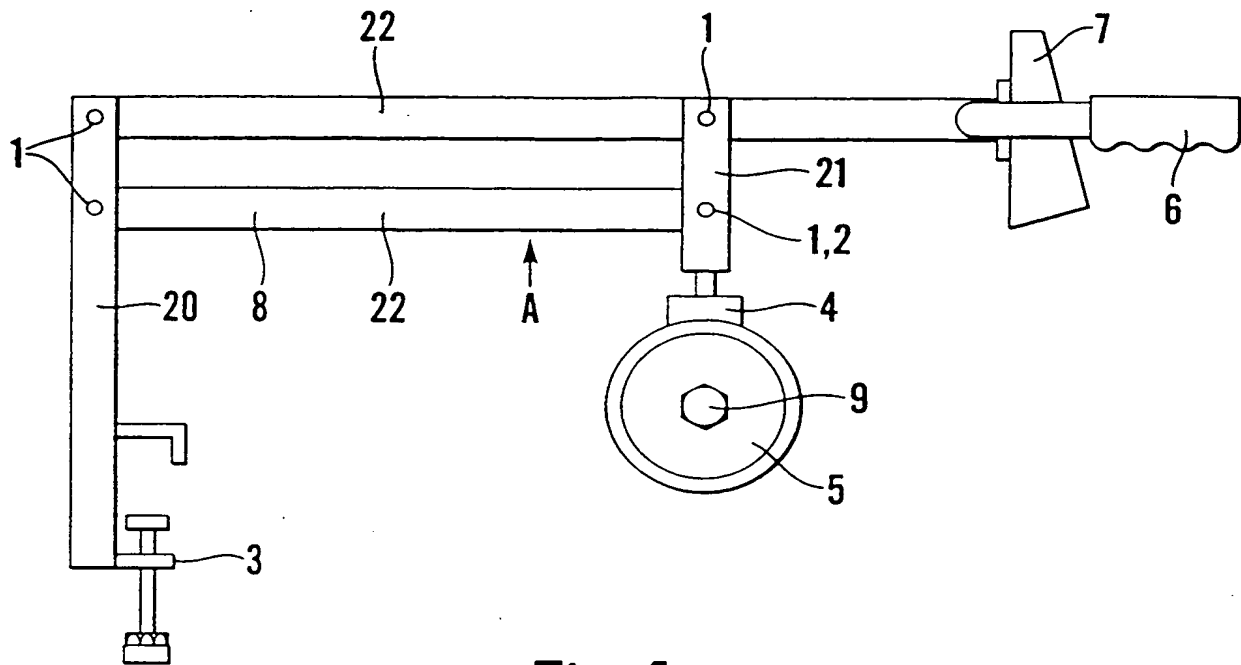


Fig. 1

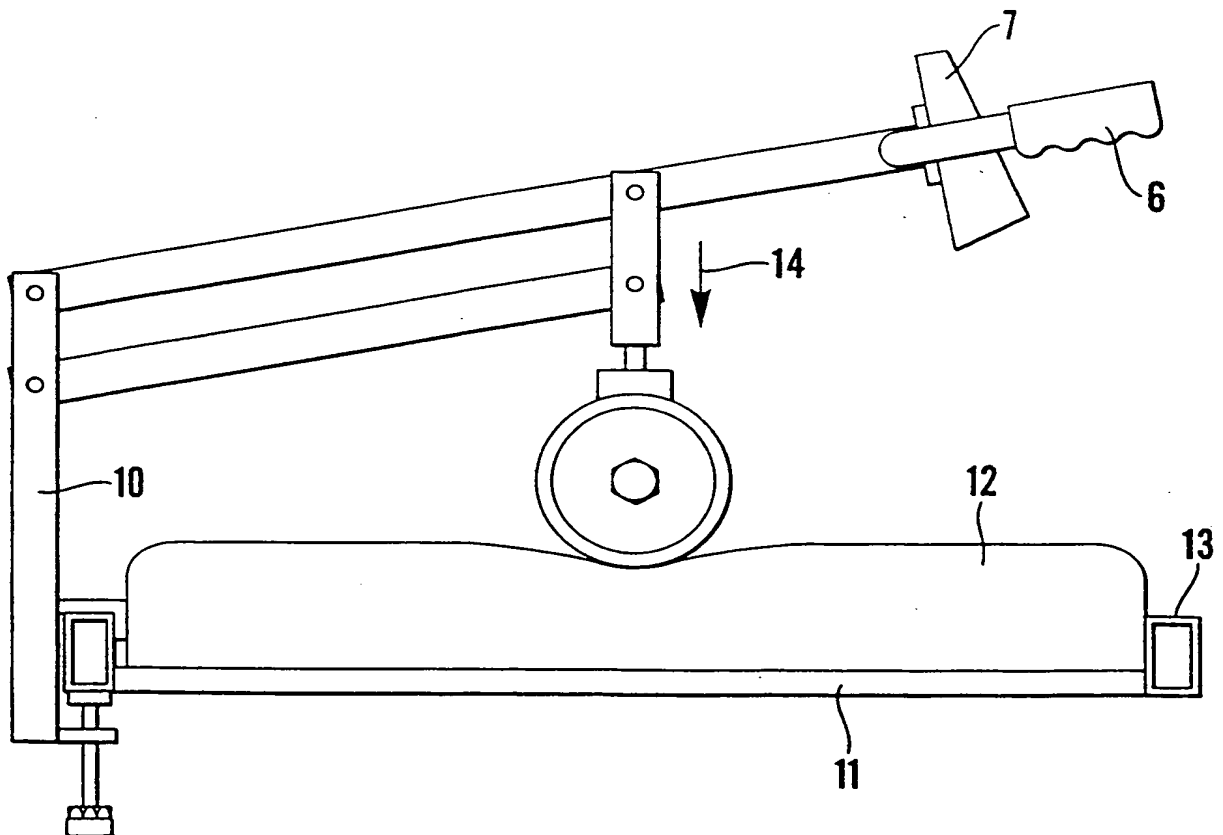


Fig. 2

3/4

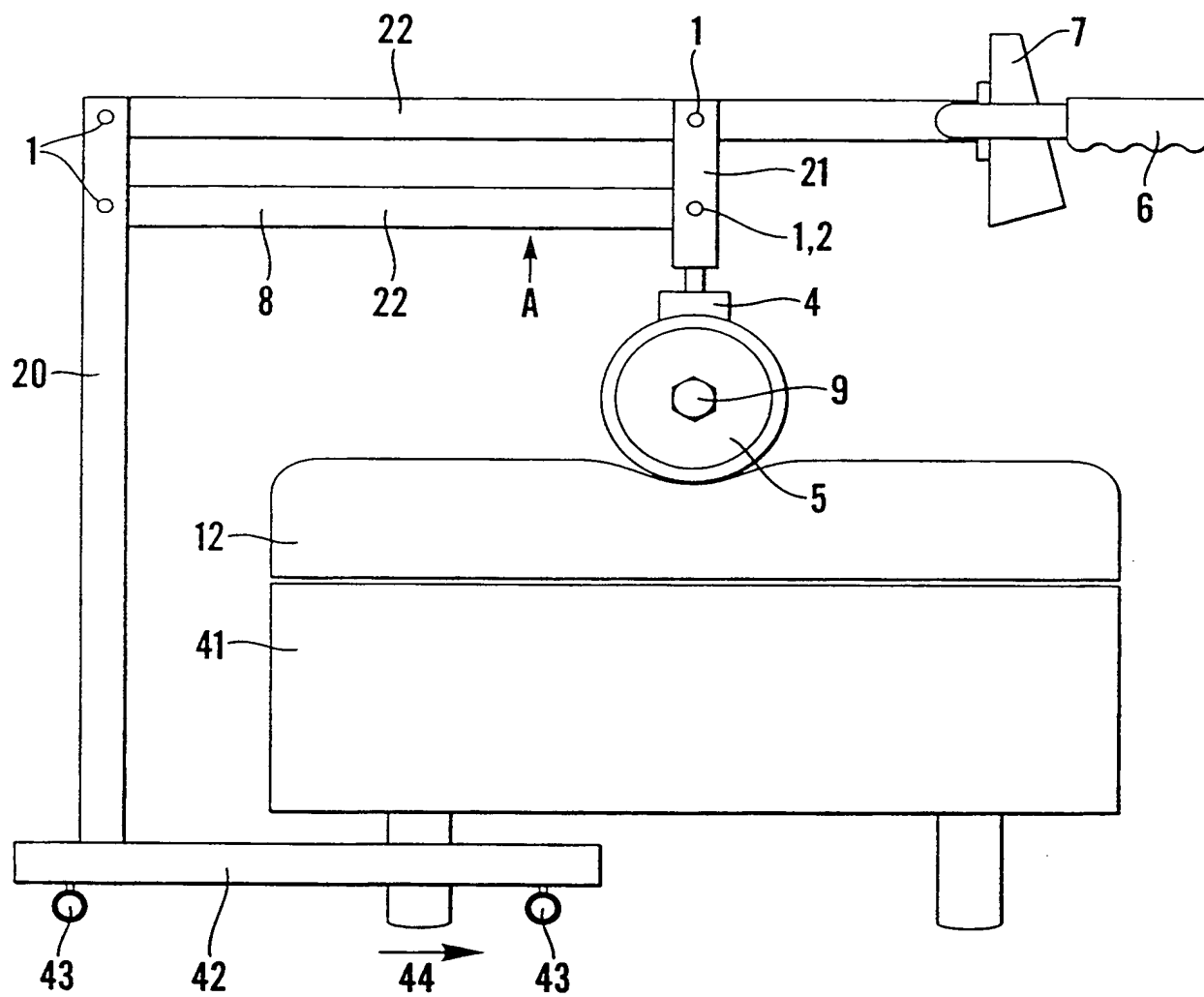


Fig.4

Not inserted

is length and subjectively forms an opinion as to the condition of the mattress. However, this subjective test has been shown to suffer from poor repeatability and inter operator reliability.

The present invention, therefore, is directed to the provision of apparatus and method for objectively determining the condition of mattresses and other support surfaces, such as seats and wheelchair cushions.

US-A-4,140,008 describes apparatus for measuring the firmness of a resilient object, such as a mattress. The apparatus described in this document comprises a platen, which is supported by a frame from a fixed base, and is drawn into the object by a motor.

According to one aspect of the present invention there is provided apparatus for assessing the condition of a person support surface which comprises a frame for extending over the support surface, an indenter mounted on said frame and a load sensor disposed between the indenter and the frame, means for pressing the indenter into the support surface, displacement measuring means for measuring the movement of the indenter into the support surface and data processing means for analysing the force applied to the indenter in relation to the displacement of the indenter into the support surface, characterised in that the apparatus is mobile and includes manually actuated means for pressing the indenter into the support surface.

2a

In general, the apparatus according to the invention will be portable and has a frame which is supported either from the bed base below the mattress, or from a base member which is adapted to extend beneath the bed base.

In a preferred form of the invention, the frame is supported in cantilever from one side of the support surface and the indenter is moved downwardly to depress the support surface by pressure applied to a handle by an operator. The frame may include guide means to guide movement of the indenter in an essentially vertical manner into contact with the support surface.

The control box may also be arranged to report that a proper measurement has been taken and may convert the load displacement data to a single number which rates the condition of the mattresses tested.

Figure 4 is a side elevation of a modification of the apparatus shown in Figures 1, 2 and 3. The upper part of the apparatus is constructed in the same way as in Figures 1, 2 and 4 and the same reference numerals are used to identify equivalent components.

In Figure 4, the vertical support post (20) is mounted on a platform (42) which may be supported on castors (43). The vertical profile of the platform and castors is low so that it can readily be pushed beneath a bed base (41), which may be of the divan type. In use, the apparatus is pushed beneath the bed base (41) until the post (20) touches the vertical side of the bed base. Handle (6) is depressed to bring the wheel into contact with the surface of the mattress (12) and is pushed into the mattress until maximum resistance is felt and the console (7) indicates that a proper reading has been taken. Data is then processed in the same way as described herein.

It is important to be able to test the mattresses when they are lying on an existing bed frame so that measurements can be taken in situ. In order to grade mattresses independently of the supporting frame, it is necessary to exclude the displacement of the base when the test is carried out. This is done by assuming that the load displacement curve of the mattress base is a straight line. This part of the data measured can be excluded by carrying out a double differential of the load

CLAIMS:-

1 Apparatus for assessing the condition of a person support surface (12) which comprises a frame (A) for extending over the support surface, an indenter (5) mounted on said frame and a load sensor (4) disposed between the indenter and the frame, means for pressing the indenter into the support surface, displacement measuring means for measuring the movement of the indenter into the support surface and data processing means for analysing the force applied to the indenter in relation to the displacement of the indenter into the support surface, characterised in that the apparatus is mobile and includes manually actuated means (6) for pressing the indenter into the support surface.

2. Apparatus according to claim 1 wherein the frame is supported in cantilever from one side of the support surface.

3. Apparatus according to claim 1 or 2 wherein the frame includes means (3) for removable attachment to a bed base for supporting a mattress.

4. Apparatus according to claim 2 wherein the frame is supported from a base member (42) adapted to extend beneath a bed base, while said frame is adapted to extend in cantilever over a mattress supported on said bed base.

5. Apparatus according to any one of the preceding claims wherein said manually operated means comprises a handle (6) for depressing the indenter into the support surface.

6. Apparatus according to any one of the preceding claims wherein the indenter (5) comprises a curved surface mounted for rotational movement on said frame.

7. Apparatus according to claim 6 wherein the curved surface comprises a wheel or sphere (5).

8. Apparatus according to any one of the preceding claims wherein the frame comprises a parallelogram linkage (1,21,22).

9. Apparatus according to any one of the preceding claims wherein said processing means (7) includes means for assigning an identifying code to the support surface to be tested and for preparing a label bearing said code and data relating to the behaviour of the mattress when tested.

10. A method of testing a mattress (12) in situ on a bed base (11,41) which comprises applying to the surface of the mattress an indenter (5), depressing the indenter into the mattress, measuring the displacement of the indenter as a function of the load applied to the indenter, constructing a load/displacement curve (51) and discriminating the displacement arising from deflection of the bed base to thereby identify the load/displacement relationship of the mattress.

09/914767

1/4

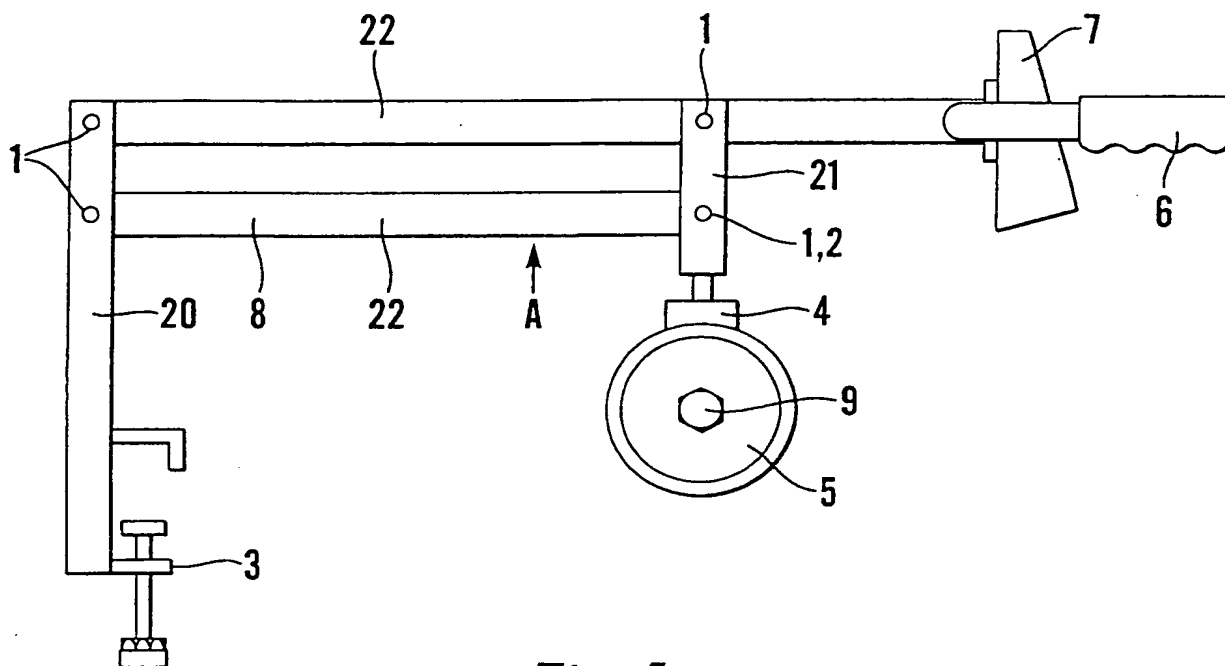


Fig. 1

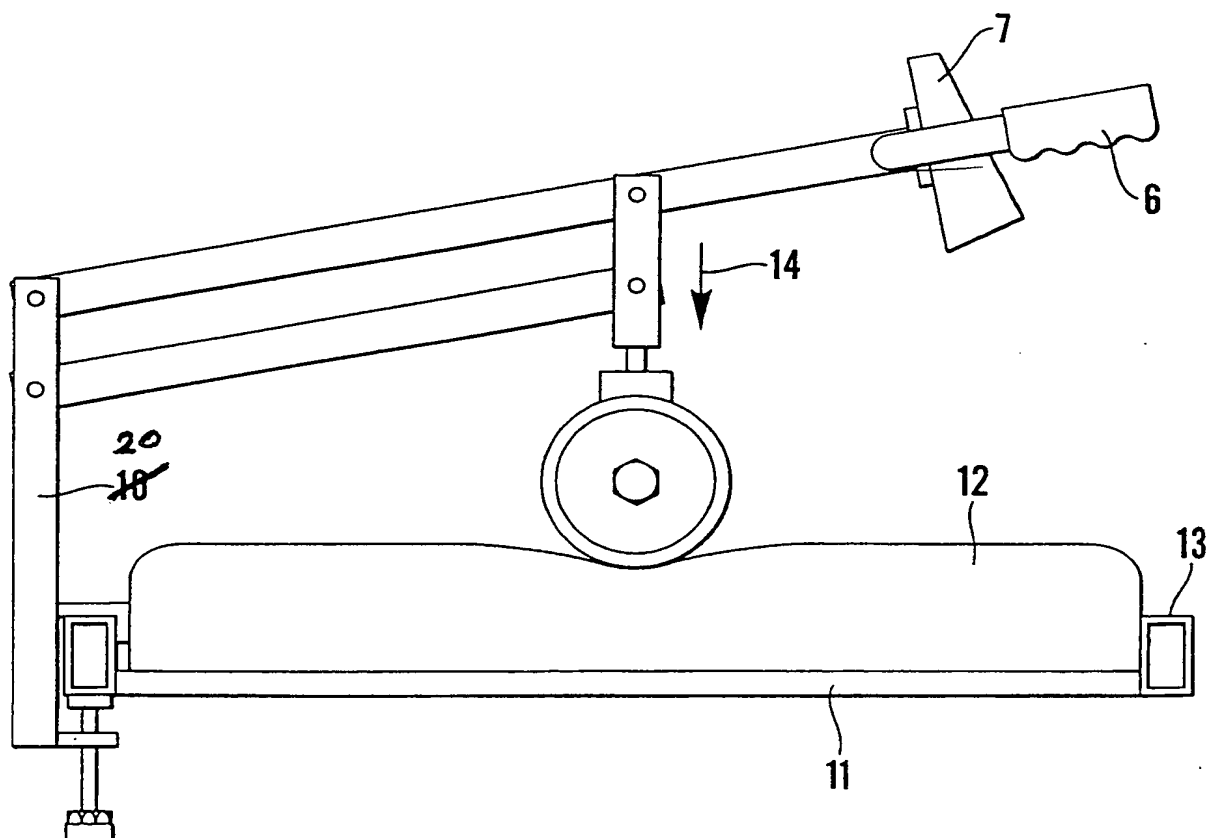


Fig. 2

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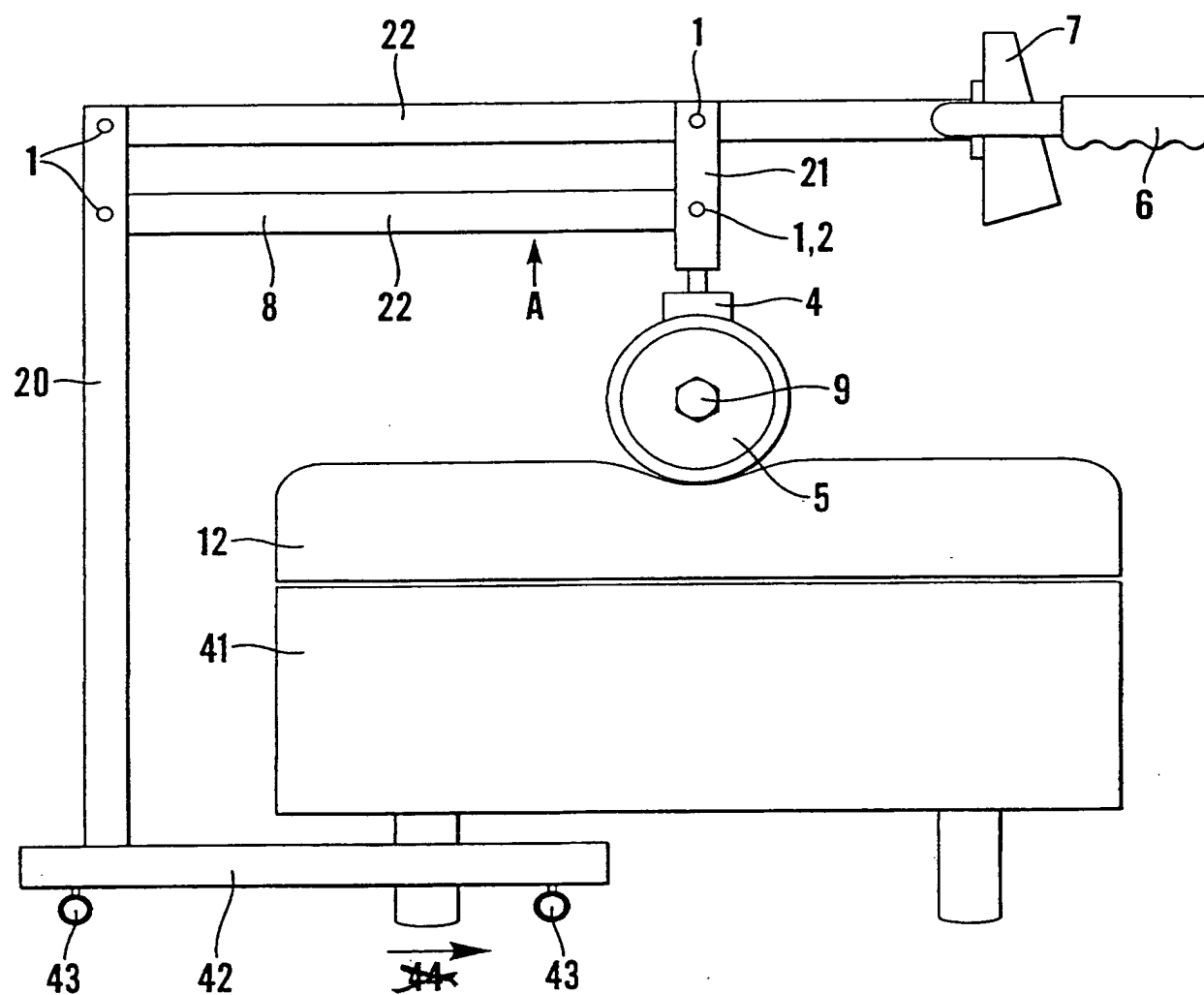


Fig.4